New findings of two rare nymphalids in Serbia (Lepidoptera: Nymphalidae)

Miloš Popović and Milan Đurić

Miloš Popović, Zvezdanska 24, 19000 Zaječar, Serbia; gpopac@gmail.com
Milan Đurić, Bulevar Oslobođenja 106/34, 11000 Beograd, Serbia; djuricm@ikomline.net

Abstract: During the past few years *Melitaea arduinna* and *Nymphalis vaualbum* were recorded on several occasions in Serbia. These findings are important as both species reach western limit of their range in Serbia. *M. arduinna* was only recently added to the fauna of Serbia, while most of data for *N. vaualbum* are very old, suggesting its possible extinction in Serbia. In this paper the recently published records for both species are summarized and 16 new records are added. Records are presented in distribution maps and the potential distribution is discussed. While *M. arduinna* was most probably overlooked and the new records are a consequence of more intensive research, in case of *N. vaualbum* the new records are likely a result of recent immigration and subsequent population increase.

Key words: faunistics, distribution, *Nymphalis vaualbum*, *Melitaea arduinna*, butterflies.

Aktuelle Nachweise zweier seltener Nymphaliden in Serbien (Lepidoptera: Nymphalidae)

Zusammenfassung: In den letzten Jahren konnten *Melitaea arduinna* und *Nymphalis vaualbum* mehrfach aus Serbien nachgewiesen werden. Diese Nachweise sind relevant, weil beide Arten dort an ihrer westlichen Arealgrenze leben. *M. arduinna* wurde erst kürzlich als serbische Art nachgewiesen, wohingegen die meisten bisherigen Nachweise von *N. vaualbum* recht alt waren und auf ein mögliches Erlöschen hinwiesen. Wir veröffentlichen hier die in den letzten Jahren bekanntgewordenen Funde und ergänzen um weitere 16 Nachweise. Die Funde werden auf Karten dargestellt, und die potentielle Verbreitung wird diskutiert. Während *M. arduinna* wahrscheinlich oft übersehen wurde und die neueren Nachweise die Folge gezielter Nachsuche waren, wird das aktuelle Vorkommen von *N. vaualbum* als Resultat einer rezenten Einwanderung mit folgender Etablierung und Vermehrung der Population gesehen.

Introduction

Nymphalis vaualbum (Denis & Schiffermüller, 1775) (Fig. 1) is a butterfly species with a Holarctic distribution, but considered rare in Europe west of Russia. Most of the historical records of *Nymphalis vaualbum* in Serbia are almost 100 years old (Forster & Wohlfahrt 1955, Anđus 2008), with only few sightings from one locality in the second half of the twentieth century (Zečević 2002). The species is declared endangered in both the Red Data Book of Serbian Butterflies (Jakšić 2003) and the Red Data Book of European Butterflies (van Swaay & Warren 2003), due to an estimated decrease of the population size of 50–80%. It requires special conservation and is listed in Annex II and Annex IV of the EU Habitats directive (92/43/EEC), Bern Convention on the conservation of European wildlife and natural habitats (1979) and declared as one of the qualifying species for Natura 2000 sites.

Melitaea arduinna (Esper, 1783) (Fig. 2) has a somewhat more limited distribution covering southern Russia and central Asia, but not reaching the Far East. Its distribution in Europe is limited to the Balkan Peninsula, with rare and scattered colonies in its southern part (Lafranchis 2004, Tolman & Lewington 2008). The species was not included in the Red Data Book of Serbian Butterflies (Jakšić 2003) as it was first discovered only in 2007 (Jakšić & Grozdanović 2007). European colonies are not well researched, so it is difficult to estimate population trends.

Material and methods

Butterfly observations were made during systematic surveys of the southeastern part of Serbia during the last years. Two mountain ranges – Suva Planina (localities Jelašnica gorge, Gornja Studena, Bojanine vode and Devojački grob) and Stara Planina (localities Temska, Topli Dol, Babin zub, Arbinje and Kopren) – were studied most extensively. Records from other parts of Serbia were gathered during field trips across Serbia, partially within framework of the PBA of Serbia project (Jakšić [ed.] 2008).

Specimens have been identified using determination keys (Lafranchis 2004, Tolman & Lewington 2008) and photographed if possible. When in doubt, authors collected specimens and prepared them for genitalia dissection. One specimen of *Nymphalis vaualbum* was caught in a butterfly trap, with rotten fruit as a bait.

Results and discussion

Until 2007, there were no records of *Melitaea arduinna* from Serbia. The closest records were from Vrška Čuka in Bulgaria (Abadjiev 2001) and northern Macedonia (Scheider & Jakšić 1989). The species has been discovered in Serbia during field research on the project Prime Butterfly Areas in Serbia, when P. Jakšić, I. Dodok, M. Đurić and A. Zelenbaba (Grozdanović) recorded species in four different localities in 2007 (Jakšić & Grozdanović 2007, Jakšić [ed.] 2008). The localities Mt. Stol, Lazarev Canyon and Mt. Deli Jovan are all very close to each other, situated in NE Serbia near the Bor town, while Mt. Rtanj is some 30 km to the south, near Boljevac town. Next year, R. Verovnik, A. Keymeulen and M. Đurić found no less than 10 ♂♂ in Jelašnica gorge E of the city of Niš (Đurić et al. 2010). On two occasions during 2009, M. Popović repeated the record for Jelašnica gorge with a ♂ in May and a ♀ in June. In June he also added a new record for Gornja Studena village, situated on the same northern slope of the Suva Planina Mt, approximately

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4 km from Jelašnica gorge to the south. In this case, just a single tatty ♀ was found. In Stara Planina *M. arduinna* was discovered in three different sites – by M. Urošević in Aldinac (Urošević 2009), by F. Franeta and M. Đurić in Topli Dol and by M. Popović in Temska. Although these localities belong to the same massif, distances between them are more than 15 km. These records indicate that the species is more common in southeast Serbia than expected and new sites are likely to be discovered in the next years.

According to our records the flight period of *M. arduinna* in Serbia is from end of May until beginning of July with ♀♀ appearing some 7–10 d later than the ♂♂. The altitudinal span of the records is from 300–900 m, but with all records from generally montaneous regions. Adults were most frequently observed in sheltered areas such as grassy woodland clearings in vicinity of oak and beech forests, and humid gorges. As such habitats are common in the region it is likely that new localities will be discovered, especially in Stara planina and Sićevo gorge.

Despite limited number of records, the *M. arduinna* distribution map gives quite a good overview (Fig. 3) showing the potential natural boundaries of the species with NW edge of the distribution along Danube and Morava river valleys. Whether its range further southwards and eastwards is contiguous with the known localities in Bulgaria and Macedonia remains to be investigated. Current published records (Abadjiev 2001, Scheider & Jakšić 1989) show a highly fragmented distribution that could be a result of lack of systematic surveys in Bulgaria and Macedonia.

Unlike the previous species, *Nymphalis vaualbum* was known in Serbia for a long time. Records show its presence in the Beograd region, Fruška Gora and Ruma (Forster & Wohlfahrt 1955, Jakšić 1988, Anđus 2008), but all of them are based on museum specimens and published data from the early years of the twentieth century. There are just a few recent records, related to the Đerdap region of the Danube valley, and they come from the 1980s and 1990s (Zečević 2002, Stojanović, pers. comm.). Everything was pointing towards possible extinction of the species in Serbia until 2006, when I. Sarić (pers. comm.) found one fresh specimen at Mt. Kopaonik. In 2007 M. Đurić found it at Mt. Kosmaj and I. Dodok and A. Zelenbaba (Grozdanović) at Lazarev Canyon (Jakšić [ed.] 2008). For some reason, the situation dramatically changed in 2009 when *Nymphalis vaualbum* was recorded on 9 occasions in 6 different localities. The first record came from Kumodraž (vicinity of Beograd), where a battered specimen was caught in the butterfly trap on 10. iv. On 16. iv. a specimen in somewhat better condition was spotted in Jelašnica gorge (Đurić et al. 2010). In Guberevac woods (some 30 km S of Beograd) there were 3 records: a specimen sheltered in an abandoned house on 2. v., a very fresh one on 10. vi., and another one on 30. vi. On 13. iv. another fresh specimen was observed at Mt. Mučanj in western Serbia. That record is significant, as the species was not previously recorded in western Serbia (Dodok 2003, Đurić 2007). The species was recorded again in Jelašnica gorge on 18. vi., this time a fresh ♀ (Đurić et al. 2010). Both records from Stara Planina have come later than the others: one in Topli Dol on 6. vii., and one in Arbinje on 16. vii.

Surprisingly the species was found together with *M. arduinna* both in Stara Planina and Suva Planina, much further south than any previous records in Europe. *N. vaualbum* has a much more scattered distribution in Serbia (Fig. 4). The historical records are all from the northern part of the country indicating that the Danube river basin could be the southern limit of the species distribution in Serbia. With new records the picture has changed dramatically and it is clear that the species occupies a much wider area in Serbia, almost to the border of Macedonia. Since only single specimens were observed it is hard to decide whether these were just vagrant individuals or residents in these regions. The presence of fresh adults does however indicate that at least limited breeding of the species is present in Serbia. Since adults

Tab. 1: Chronological list of recent records of the two species in Serbia.

Date	Location	UTM (34T)		Altitude [m]
		Easting	Northing	
Melitaea arduinna				
1. vi. 2007	Mt. Rtanj	572350	4849658	376
18. vi. 2007	Lazarev canyon	576276	4874984	467
19. vi. 2007	Mt. Stol	589437	4893902	869
20. vi. 2007	Mt. Stol	590315	4892595	848
21. vi. 2007	Mt. Deli Jovan	596980	4907051	428
30. v. 2008	Jelašnica gorge	586719	4791641	334
23. v. 2009	Jelašnica gorge	586719	4791641	334
18. vi. 2009	Jelašnica gorge	586719	4791641	334
19. vi. 2009	Mt. Suva Planina	618749	4820355	744
19. vi. 2009	Mt. Stara Planina	589783	4789103	800
3. vii. 2009	Mt. Stara Planina	626633	4794730	684
11. vii. 2009	Mt. Stara Planina	635606	4800601	751
Nymphalis vaualbum				
22. vii. 2006	Mt. Kopaonik	488562	4794158	1420
14. iii. 2007	Mt. Kosmaj	465188	4925168	333
18. vi. 2007	Lazarev canyon	576276	4874984	467
10. iv. 2009	Kumodraž	460350	4952700	181
16. iv. 2009	Jelašnica gorge	586719	4791641	334
2. v. 2009	Guberevac	459510	4932086	201
10. vi. 2009	Guberevac	459510	4932086	201
13. vi. 2009	Mt. Mučanj	421426	4822377	1324
18. vi. 2009	Jelašnica gorge	586719	4791641	334
30. vi. 2009	Guberevac	459510	4932086	201
6. vii. 2009	Mt. Stara Planina	638620	4799753	638
16. vii. 2009	Mt. Stara Planina	644374	4793414	1206

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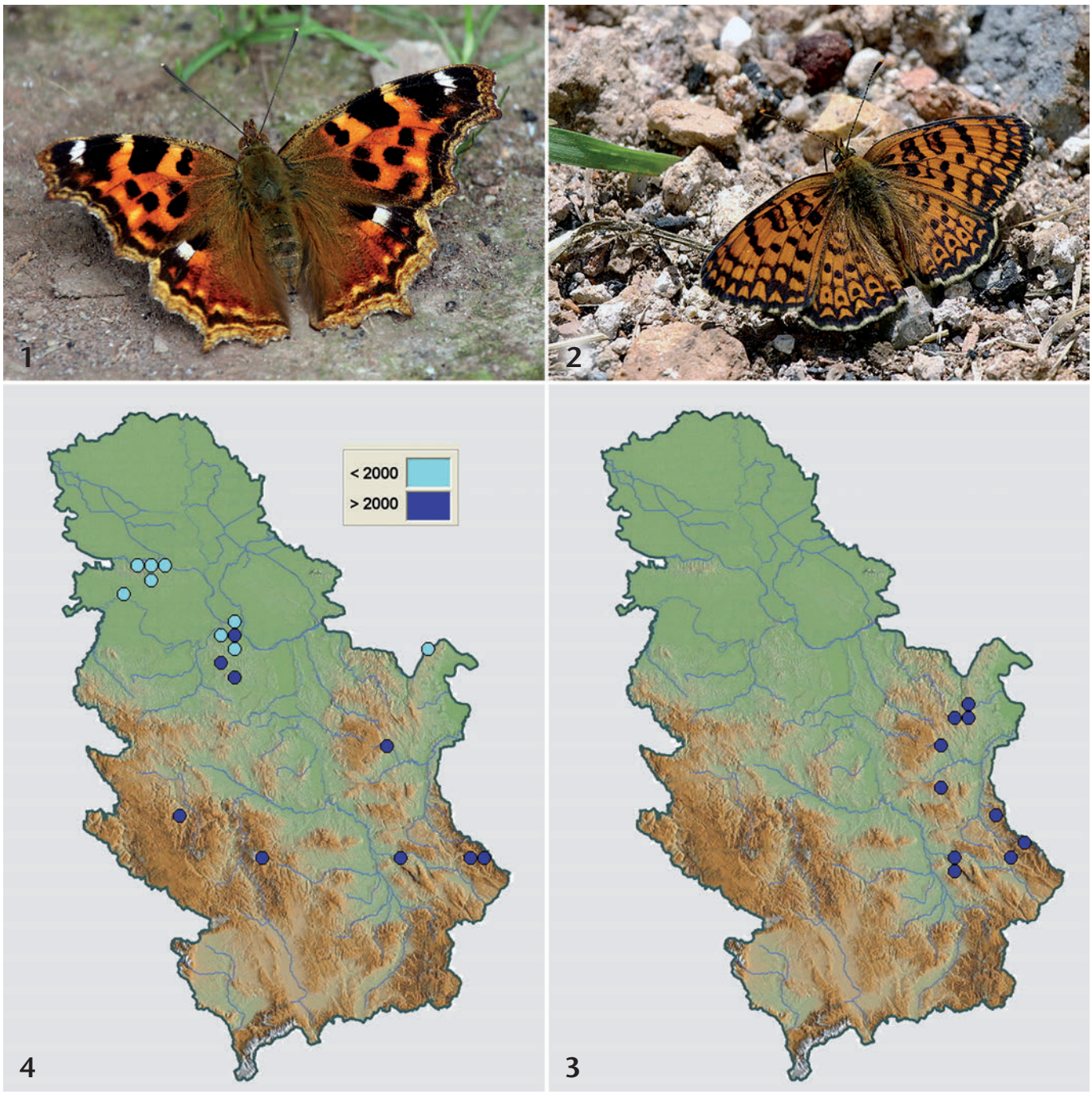

Fig. 1: *Nymphalis vaualbum*, ♀, Jelašnica Gorge, 18. VI. 2009. **Fig. 2:** *Melitaea arduinna*, ♂, Jelašnica Gorge, 23. V. 2009. — Photos M. Popović. — **Fig. 3:** Distribution map of *Melitaea arduinna* in Serbia. **Fig. 4:** Distribution map of *Nymphalis vaualbum* in Serbia.

are present in low densities it is likely that they were overlooked in many places and *N. vaualbum* could be more widespread than previously thought.

Overwintering adults have been recorded from 14. III. to 2. V., and the fresh specimens of summer brood from 10. VI. to 22. VII. Altitudinal span is rather large ranging from 180 to 1420 m (Table 1). In each case butterflies were observed in woodland clearing near deciduous woods.

The records from southern Serbia represent a large extension of the known range of the species in Europe towards the southern part of the Balkan Peninsula as both Tolman & Lewington (2008) and Kudrna (2002) do not show any records in Serbia. The closest record published so far was the one for surroundings of Sofia by Abadjiev (2001). It is however interesting to note that a single specimen of *N. vaualbum* was found also in Durmitor Mts. much further to the SW in Montenegro (Bretherton 1973). Only with further systematic research we shall be able to see whether the large expansion of 2009 was just temporary or the butterfly will stay or continue to spread in Serbia.

Conclusions

New records of *N. vaualbum* and *M. arduinna* represent an important addition to the knowledge of the distribution of these two rare butterfly species in Europe. The presence of *N. vaualbum* is of particular importance as

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the species is considered highly threatened in Europe. The new records also show a lack of systematic faunistic research in Serbia in past decades and emphasize that there is still plenty of surprises hidden in the still insufficiently explored countryside of Serbia.

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